Clinical chemistry sample interference patterns in Ontario laboratories

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ABSTRACT

Clinical chemistry laboratories are required to determine patient test results accurately and reports these results in a timely manner. Interferences can compromise test results and provide inaccurate test results. The QMP–LS routine Chemistry survey in October 2010. Questions and responses were summarized in the result section.

Methods: Survey questions regarding assessment and reporting of interferences were distributed to 183 chemistry participants as part of the notification of physicians, commenting pattern, and criteria for specimen rejection when an interferent is identified. The aim of this taking necessary actions are crucial for patients’ outcomes. Nevertheless, there is no consensus on determination of interferences, clinical laboratory analysis. To reduce unwanted effect on patient outcomes, identification and reporting of the interferences, and this information is not readily available to health-care providers, identification of the affected analytes and direction of impact when reporting interferences would provide greater clarity and clinical utility.

Results:

1. Types of interferences assessed: 99% of the laboratories were assessing at least one of the following interferences: hemolysis, lipemia, and patient’s history (80%).

2. Instrument or visual interference assessments methods in determining the interferents: Laboratories were asked how they performed visual assessment, only 5% of laboratories reported for all analytes for a given specimen.

3. Type of visual procedures: 41% of the laboratories do not use any type of visual clearing procedures for analysis of specimens (Fig 1). Analytical performance of measurement systems used in clinical chemistry has been improved and analytical errors have decreased over the years. However, interferences arising from endogenous and exogenous substances are still significant sources of errors.

4. Interferent information included in the patient reports: Interference information reported showed differences between laboratories. In laboratories that reported interference, 75% included the affected analyte, and only 40% reported the direction of the impact. Laboratories utilizing visual assessment for identification of the interferent, 62% evaluated visually. Among laboratories performing visual assessment, only 34% were using reference charts. Of the laboratories using reference charts, 23% did not use visual assessment for identification of the interferent. Only 10% of the laboratories recollect specimens at all levels of hemolysis, 34% triggered automatic samples at hemolysis levels (40%) reported for all analytes for a given specimen (Fig 3).

5. Source of interference reference: Laboratories utilized more than one method to identify affected analytes where an interference was identified (Fig 4). Of the laboratories that obtained interference data from the manufacturers, 10% performed house interference studies and 12% (7%) other interferences. In laboratories that did not obtain interference data from the manufacturers, 10% only included analyte(1%) laboratories did not respond (Fig 7).

6. Specimen recollection for the hemolysis interference: Laboratories’ specimen recollection procedures were also investigated. Sixty-eight laboratories assessing interferences with chemistry analyzers were asked if they report qualitative, semi-quantitative, and quantitative hemolysis information in their patient reports. Sixty-eight (62%) laboratories assessed interferences with chemistry analyzers. Among laboratories performing visual interference assessment, only 34% were using reference charts. Only 10% of the laboratories recollect specimens at all levels of hemolysis, 34% triggered automatic samples at hemolysis levels (40%) reported for all analytes for a given specimen (Fig 3).

7. Types of lipid clearing procedures: 67% of the laboratories do not use any type of lipid clearing procedures for analysis of specimens (Fig 5). Lipemia alters test results when the measurement principle is based on light transmission or scattering. In addition, it leads to change in the analyte concentration because of volume displacement. Using lipid clearing procedures before testing is one of the recommended strategies to increase test accuracy. However, 67% of the laboratories did not perform lipid clearing procedures before testing.

8. Interference reporting styles: 107 (95%) laboratories reported presence of interferents only if the affected analytes, while 70% reported the interference as an event per specimen (Fig 6).

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Conclusion:

After hemolysis, lipemia and lipoprotein and lipemia can have significant effects an accurate interpretation of test results, not all laboratories report these processes.

- Laboratories often report type of interferent and includes those interferents that are considered interfering in a laboratory setting. However, it is not clear how the laboratories determine the source of interference.

- In laboratories that did not respond (Fig 7). Laboratory interferences are due to a variety of factors including endogenous and exogenous substances.

- Since 95% of the laboratories obtained interference data from the manufacturers, the ability to determine the type of interference, and direction of impact when reporting interferences would provide greater clarity and utility.

References


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